MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

HMM1011 – BASIC MICROBIOLOGY

(All Sections / Groups)

12 MARCH 2016
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This paper consists of **10** pages with **2** Parts (**A** and **B**).

2. **Part A** consists of **20** Multiple Choice Questions (MCQs). All questions carry equal marks. Answer **ALL** questions in the **OMR answer sheet** provided on Page 5 of this paper.

3. **Part B** consists of **5** Short Answer Type questions. All questions carry equal marks (10 marks per question). Attempt only **FOUR** out of FIVE questions. Write your answers clearly and neatly in the boxes provided.

PART A: Multiple Choice Questions **[10 marks]**

1. Which of the following is NOT a function of a glycocalyx?

   A. It forms pseudopodia for faster mobility of an organism.
   B. It can protect a bacterial cell from drying out.
   C. It hides the bacterial cell from other cells.
   D. It allows a bacterium to stick to a host.

2. Which of the following is different between light microscopy and transmission electron microscopy?

   A. Magnification
   B. Resolution
   C. Wavelengths
   D. All of the above

3. Which of the following can grow in a Petri plate on a laboratory table?

   A. An anaerobe
   B. A colony on an agar surface
   C. Viruses on an agar surface
   D. Barophiles

4. Sterile paper disks are soaked in one of the three disinfectants: P, Q, and R. The disks are placed on medium inoculated with a bacterium and incubated. The following chart indicates the results:

Disinfectants	Zone of Inhibition
P	13 mm
Q	4.5 mm
R	10 mm

   Assuming the disinfectants diffuse at the same rates and are equally stable, which disinfectant was most effective against this bacterium?

   A. Disinfectant P
   B. Disinfectant Q
   C. Disinfectant R
   D. All are equally effective

5. A sample of *E. coli* has been subjected to heat for a specified time, and 90% of the cells have been destroyed. Which of the following terms best describes this event?

   A. Thermal death point
   B. Thermal death time
   C. Decimal reduction time
   D. None of the above

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6. Flexible spiral-shaped prokaryotes are_____.

   A. spirilla
   B. spirochetes
   C. vibrias
   D. richettsias

7. The type of reproduction in prokaryotes that results in a palisade arrangement of cells is called _____.

   A. pleomorphic division
   B. endospore formation
   C. snapping division
   D. binary fission

8. Branched, tubular filaments with crosswalls found in large fungi are_____.

   A. septate hyphae
   B. aseptate hyphae
   C. aseptate haustoria
   D. dimorphic mycelia

9. The motile feeding stage of protozoan is called _____.

   A. an apicomplexa
   B. a gametocyte
   C. a cyst
   D. a trophozoite

10. Carrageenan is found in the cell walls of which group of algae?

   A. Red algae
   B. Green algae
   C. Dinoflagellates
   D. Yellow-green algae

11. Which of the following is NOT a criterion for a specific family classification of viruses?

   A. The type of nucleic acid present
   B. Envelope structure
   C. Capsid type
   D. Lipid composition

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12. A clear zone of phage infection in a bacterial lawn is a _____.

A. prophage
B. plaque
C. naked area
D. capsomere

13. A disease in which a pathogen remains inactive for a long period of time before becoming active is termed as _____.

A. subacute disease
B. acute disease
C. chronic disease
D. latent disease

14. Consider the following case. An animal was infected with a virus. A mosquito bit the animal, was contaminated with the virus, and proceeded to bite and infect a person. Which was the vector?

A. Animal
B. Virus
C. Mosquito
D. Person

15. Interferons_____.

A. do not protect the cell that secretes them
B. stimulate the activity of neutrophils
C. cause muscle aches, chills, and fever
D. all of the above

16. The complement system involves_____.

A. the production of antigens and antibodies
B. serum proteins involved in nonspecific defense
C. a set of genes that distinguish foreign cells from body cells
D. the elimination of undigested remnants of microorganisms

17. An autoantigen is _____.

A. a normal body component
B. an antigen from bacteria
C. an artificial antigen
D. any carbohydrate antigen

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18. The major class of immunoglobulin found on the surfaces of the walls of the intestines and airways is _____.

A. IgG
B. IgA
C. IgE
D. IgM

19. During chemical treatment of drinking water and waste-water, which of the following microbes is least likely to be inactivated or killed?

A. Algae
B. Bacterial endospores
C. Fungal spores
D. Viruses

20. Food fermentation do all of the following EXCEPT _____.

A. give foods a characteristic taste
B. lower the risk of food spoilage
C. sterilize foods
D. increase the shelf life of the food

MULTIPLE CHOICE QUESTIONS OMR ANSWER SHEET

1.	(A)(B)(C)(D)(E)	6.	(A)(B)(C)(D)(E)	11.	(A)(B)(C)(D)(E)	16.	(A)(B)(C)(D)(E)
2.	(A)(B)(C)(D)(E)	7.	(A)(B)(C)(D)(E)	12.	(A)(B)(C)(D)(E)	17.	(A)(B)(C)(D)(E)
3.	(A)(B)(C)(D)(E)	8.	(A)(B)(C)(D)(E)	13.	(A)(B)(C)(D)(E)	18.	(A)(B)(C)(D)(E)
4.	(A)(B)(C)(D)(E)	9.	(A)(B)(C)(D)(E)	14.	(A)(B)(C)(D)(E)	19.	(A)(B)(C)(D)(E)
5.	(A)(B)(C)(D)(E)	10.	(A)(B)(C)(D)(E)	15.	(A)(B)(C)(D)(E)	20.	(A)(B)(C)(D)(E)

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PART B: Short Answer Type Questions

QUESTION 1

a) Defend this statement: "The investigation of Antoni van Leeuwenhoek changed the world forever." **[2 marks]**

b) List Koch's postulates, and explain why they are significant. **[3 marks]**

c) Why aren't Koch's postulates always useful in proving the cause of a given disease? **[3 marks]**

d) Sketch, name, and describe FOUR flagellar arrangements in bacteria. **[2marks]**

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QUESTION 2

a) Two cultures of a facultative anaerobe are grown in the same type of medium, but one is exposed to air and the other is maintained under anaerobic conditions. Which of the two cultures will contain more cells at the end of a week? Why? **[2 marks]**

b) Describe how bacterial fermentation causes milk to sour. **[1 mark]**

c) Pasteurization is a technique that uses temperatures of about 72°C to neutralize potential pathogens in foods. What effect does this temperature have on the enzymes and cellular metabolism of pathogens? Why does the heat of pasteurization kill some microorganisms yet fail to affect thermophiles? **[2 marks]**

d) Hyperthermophilic prokaryotes may remain viable in canned goods after commercial sterilization. Why is this situation not dangerous to consumers? **[1 mark]**

e) A new chemotherapeutic drug kills bacteria, but not humans. Discuss the possible ways the drug may act selectively on bacterial cells. **[4 marks]**

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QUESTION 3

a) Draw a tree of life to show the Three-Domain model and the Six-Kingdom model proposed in taxonomic classification of organisms. **[2 marks]**

b) With the exception of the discovery of new organisms, is it logical to assume that taxonomy as we currently know it will stay the same? Why or why not? **[2 marks]**

c) Describe the five phases of a generalized lytic replication cycle of a virus. **[5 marks]**

d) Why are DNA viruses more likely to cause neoplasias than RNA viruses? **[1 mark]**

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QUESTION 4

a) List THREE conditions that create opportunities for pathogens to become harmful in a human. **[1.5 marks]**

b) List THREE portals through which pathogens enter the body. **[1.5 marks]**

c) If an enveloped virus were somehow released from a cell without budding, it would not have an envelope. What effect would this have on the virulence of the virus? Why? **[2 marks]**

d) If a mutation occurred in *Escherichia coli* that deleted the gene for an adhesin, what effect might it have on the ability of *E. coli* to cause urinary tract infections? **[2 marks]**

e) If you were a career counselor directing a young student in the field of applied microbiology, describe three possible disciplines you could mention. **[3 marks]**

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QUESTION 5

a) Compare and contrast the protective structures and chemicals of the skin and mucous membranes. **[2 marks]**

b) Sweat glands in the armpits secrete perspiration with a pH close to neutral (7.0). How does this fact help explain body odor in this area as compared to other parts of the skin? **[2 marks]**

c) Contrast innate defenses with adaptive immunity. **[4 marks]**

d) Compare the advantages and disadvantages of passive and active immunization. **[2 marks]**

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